PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

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Applicant:	Jozef Brcka
Art Unit:	1792
Examiner:	Maureen Gramaglia Arancibia
Title:	COMPACT, DISTRIBUTED INDUCTIVE ELEMENT FOR LARGE SCALE INDUCTIVELY-COUPLED PLASMA SOURCES
Attorney Docket:	TAZ-246

VIA ELECTRONIC FILING
Box AF
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

RULE 132 DECLARATION OF JOZEF BRCKA, Ph.D.

This Declaration is submitted to place in the record, for purposes of appeal, evidence to show that an essential basis for the Examiner's rejection that is based on an unsupported technical assumption is erroneous.

I, Jozef Brcka, Ph.D., am the inventor of the claimed subject matter of the present patent application. I am employed by the U.S. subsidiary of Tokyo Electron Limited of Japan (TEL) in the development of plasma processing equipment and processes used in the manufacture of semiconductors and other electronics systems. One of my primary responsibilities is the simulation of plasma properties in the design of plasma reactors and the development of plasma properties for equipment manufactured by TEL. The simulations are important because the complexities of the chemistry and physics that are present in reactors of varying geometries cannot be solved by direct computational methods with the degree of precision required for the manufacture of semiconductors with sub-micron features, and the equipment is too expensive to be manufactured on a trial and error basis. In conducting the simulations, I

use sophisticated software which I have refined to handle the complex equations involved in plasma physics.

I have read the Final Office Action dated April 11, 2008, in this application as well as the Examiner's supplemental explanation of it in the Advisory Action dated July 3, 2008, in which the Examiner stated that

> "...the inductor 120 taught by Hama has all of the specified structural features of the claimed invention. Further, Examiner maintains that the functional reasoning explaining that the functional limitations in the means-plus-function language have also been fully and properly considered. Examiner has set forth a ***cogent technical reasoning*** explaining that the structure taught by Hama meets all of the structural limitations in the claims, and that ***while not expressly taught*** by Hama, the inductor of Hama ***would be structurally capable of*** performing the specified function of ***coupling RF energy from the RF alternating high and low plasma density distribution, wherein small cross-section segments of the loop couple energy into the high power density segments of the plasma and the large cross-section segments of the loop couple energy into the low power density segments of the plasma, since the irregularly shaped notches 120a create segments of alternating higher and lower cross-sections and widths in the inductor 120 (Figure 2), and such segments would necessarily create alternating localized areas of lower power density or higher power density*** due to the relative concentration of the applied RF power by the conductive segments." [Emphasis Added.]

The Examiner has cited no evidence or authority to support the so-called "cogent technical reasoning" quoted in the paragraph above. Accordingly, I have conducted a simulation of the plasma density distribution that would be produced by the antenna described in the Hama patent. A report on the simulations referred to herein is attached as **Exhibit A**. I performed the simulations for a Hama antenna with the plural square windings as shown in the patent drawings having (A1) only the zig-zags, (A2) the zig-zags and notches as shown, and (A3) neither the zig-zags nor the notches. The simulations establish that the entire cogent technical reasoning of the Examiner quoted in the paragraph above is technically erroneous. More particularly, my simulations show that the Hama antenna is not in any sense structurally capable of performing the specified function of coupling RF energy from the RF alternating high and low plasma density distribution in which small cross-section segments couple energy into high power density segments of the plasma and large cross-section segments couple energy into low power density segments

of the plasma. In fact, the simulations demonstrate that there is no significant effect from either the notches or the zig-zags of the Hama antenna in the power density distribution of the plasma produced by the antenna. The only variations in power density produced by the antenna are insignificant variations of less than an order of magnitude and are due only to the square configuration of the antenna that amounts to a minor variation in the radius of the conductor around the center of the antenna that have no relation to alternating higher and lower cross-sections and widths of the antenna. These minor variations in plasma density make no significant contribution to producing a power distribution variation as produced by my invention, and have no correlation to the zig-zags or notches of the antenna conductor of Hama.

I hereby declare that all statements made herein of my own knowledge are true, and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of my patent application as originally filed and/or any patents to be issued and/or to be granted thereon.

September 10, 2008
DATE

Signature: Jozef Brcka, Ph.D.